	U	1	Document ID	Issue Date	Pages	Title
1	☐	☐	US 20010002397 A1	20010531	20	24-Hydroxyvitamin D, analogs and uses thereof
2	☐	☐	US 6329357 B1	20011211	42	Therapeutically effective 1.alpha., 25-dihydroxyvitamin D3 analogs and methods for treatment of vitamin D diseases
3	☐	☐	US 6242434 B1	20010605	19	24-hydroxyvitamin D, analogs and uses thereof
4	☐	☐	US 6162801 A	20001219	10	External ophthalmic preparation containing vitamin D
5	☐	☐	US 6103709 A	20000815	42	Therapeutically effective 1.alpha.,25-dihydroxyvitamin D.sub.3 analogs and methods for treatment of vitamin D diseases
6	☐	☐	US 5972917 A	19991026	15	1 .alpha.-hydroxy-25-ene-vitamin D, analogs and uses thereof
7	☐	☐	US 5795882 A	19980818	17	Method of treating prostatic diseases using delayed and/or sustained release vitamin D formulations
8	☐	☐	WO 9905292 A	20000802	66	Screening of ligand precursor activators - using an expression system containing a gene for a nuclear receptor binding the active ligand, together with a reporter gene

	Current OR	Current XRef	Retrieval Classif	Inventor	S	C	P	2
1	514/167	514/168; 552/653		Bishop, Charles W. et al.	☒	☐	☐	☐
2	514/167			Norman, Anthony W. et al.	☒	☐	☐	☐
3	514/167			Bishop, Charles W. et al.	☒	☐	☐	☐
4	514/167	514/912		Kita, Kiyoshi	☒	☐	☐	☐
5	514/167	552/653		Norman, Anthony W. et al.	☒	☐	☐	☐
6	514/167	552/653		Bishop, Charles W. et al.	☒	☐	☐	☐
7	514/170			Bishop, Charles W. et al.	☒	☐	☐	☐
8				KATO, S et al.	☒	☐	☐	☐

	3	4	5	Image Doc. Displayed	PT
1	☐	☐	☐	US 20010002397	☐
2	☐	☐	☐	US 6329357	☐
3	☐	☐	☐	US 6242434	☐
4	☐	☐	☐	US 6162801	☐
5	☐	☐	☐	US 6103709	☐
6	☐	☐	☐	US 5972917	☐
7	☐	☐	☐	US 5795882	☐
8	☐	☐	☐	WO 9905292 A1	☐

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NEWS 2	Jan 25	BLAST(R) searching in REGISTRY available in STN on the Web
NEWS 3	Jan 25	Searching with the P indicator for Preparations
NEWS 4	Jan 29	FSTA has been reloaded and moves to weekly updates
NEWS 5	Feb 01	DKILIT now produced by FIZ Karlsruhe and has a new update frequency
NEWS 6	Feb 19	Access via Tymnet and SprintNet Eliminated Effective 3/31/02
NEWS 7	Mar 08	Gene Names now available in BIOSIS
NEWS 8	Mar 22	TOXLIT no longer available
NEWS 9	Mar 22	TRCTHERMO no longer available
NEWS 10	Mar 28	US Provisional Priorities searched with P in CA/CAplus and USPATFULL
NEWS 11	Mar 28	LIPINSKI/CALC added for property searching in REGISTRY
NEWS 12	Apr 02	PAPERCHEM no longer available on STN. Use PAPERCHEM2 instead.
NEWS 13	Apr 08	"Ask CAS" for self-help around the clock
NEWS 14	Apr 09	BEILSTEIN: Reload and Implementation of a New Subject Area
NEWS 15	Apr 09	ZDB will be removed from STN

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FILE 'USPATFULL' ENTERED AT 15:30:36 ON 15 APR 2002
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=> s (vitamin (a) d3) (s) conver? (s) (nuclear (a) receptor)

L1 14 (VITAMIN (A) D3) (S) CONVER? (S) (NUCLEAR (A) RECEPTOR)

=> dup rem l1

PROCESSING COMPLETED FOR L1
L2 7 DUP REM L1 (7 DUPLICATES REMOVED)

=> d l2

L2 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2002 ACS
AN 1998:709642 CAPLUS
TI Sustained osteoblast **nuclear receptor** binding of
converted 1.alpha.,25-dihydroxy **vitamin D3**
after administration of 3H-1.alpha.-hydroxyvitamin D3: A combined
receptor
autoradiography and radioassay time course study with comparison to
3H-1.alpha.,25-dihydroxy **vitamin D3**
AU Koike, N.; Ichikawa, F.; Nishii, Y.; Stumpf, W. E.
CS Fuji Gotemba Research Lab., Chugai Pharmaceutical Co., Ltd., Shizuoka,
412-8513, Japan
SO Calcif. Tissue Int. (1998), 63(5), 391-395
CODEN: CTINDZ; ISSN: 0171-967X
PB Springer-Verlag New York Inc.
DT Journal
LA English

=> d l2 total ibib kwic

L2 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1998:709642 CAPLUS
TITLE: Sustained osteoblast **nuclear receptor** binding of **converted** 1.alpha.,25-dihydroxy **vitamin D3** after administration of 3H-1.alpha.-hydroxyvitamin D3: A combined receptor autoradiography and radioassay time course study with comparison to 3H-1.alpha.,25-dihydroxy **vitamin D3**
AUTHOR(S): Koike, N.; Ichikawa, F.; Nishii, Y.; Stumpf, W. E.
CORPORATE SOURCE: Fuji Gotemba Research Lab., Chugai Pharmaceutical Co., Ltd., Shizuoka, 412-8513, Japan
SOURCE: Calcif. Tissue Int. (1998), 63(5), 391-395
CODEN: CTINDZ; ISSN: 0171-967X
PUBLISHER: Springer-Verlag New York Inc.
DOCUMENT TYPE: Journal
LANGUAGE: English
TI Sustained osteoblast **nuclear receptor** binding of **converted** 1.alpha.,25-dihydroxy **vitamin D3** after administration of 3H-1.alpha.-hydroxyvitamin D3: A combined receptor autoradiography and radioassay time course study with comparison to 3H-1.alpha.,25-dihydroxy **vitamin D3**

L2 ANSWER 2 OF 7 MEDLINE DUPLICATE 1
ACCESSION NUMBER: 97218204 MEDLINE
DOCUMENT NUMBER: 97218204 PubMed ID: 9065436
TITLE: Inhibition of peroxisome proliferator signaling pathways by thyroid hormone receptor. Competitive binding to the response element.
AUTHOR: Miyamoto T; Kaneko A; Kakizawa T; Yajima H; Kamijo K; Sekine R; Hiramatsu K; Nishii Y; Hashimoto T; Hashizume K
CORPORATE SOURCE: Department of Geriatrics, Endocrinology and Metabolism, Shinshu University School of Medicine, Matsumoto 390, Japan.
SOURCE: JOURNAL OF BIOLOGICAL CHEMISTRY, (1997 Mar 21) 272 (12) 7752-8.
Journal code: HIV; 2985121R. ISSN: 0021-9258.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199704
ENTRY DATE: Entered STN: 19970506
Last Updated on STN: 19970506
Entered Medline: 19970418
AB . . . and thyroid hormone play an important role in the metabolism of lipids. These effectors display their action through their own **nuclear receptors**, peroxisome proliferator-activated receptor (PPAR) and thyroid hormone receptor (TR). PPAR and TR are ligand-dependent, DNA binding, trans-acting transcriptional factors belonging to the erbA-related **nuclear receptor** superfamily. The present study focused on the **convergence** of the effectors on the peroxisome proliferator response element (PPRE). Transcriptional activation induced by PPAR through a PPRE was significantly. . . not affected by adding 3,5,3'-triiodo-L-thyronine (T3). Furthermore, the inhibition was not observed in cells cotransfected with retinoic acid receptor or **vitamin D3** receptor. The inhibitory action by TR was lost by introducing a mutation in the DNA

binding domain of TR, indicating. . .

L2 ANSWER 3 OF 7 MEDLINE DUPLICATE 2
ACCESSION NUMBER: 96182105 MEDLINE
DOCUMENT NUMBER: 96182105 PubMed ID: 8622645
TITLE: Selective effects of ligands on vitamin D3 receptor- and retinoid X receptor-mediated gene activation in vivo.
AUTHOR: Lemon B D; Freedman L P
CORPORATE SOURCE: Molecular Biology Program, Memorial Sloan-Kettering Cancer Center, New York 10021, USA.
CONTRACT NUMBER: CA08748 (NCI)
DK45460 (NIDDK)
SOURCE: MOLECULAR AND CELLULAR BIOLOGY, (1996 Mar) 16 (3) 1006-16.
Journal code: NGY; 8109087. ISSN: 0270-7306.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199606
ENTRY DATE: Entered STN: 19960627
Last Updated on STN: 19970203
Entered Medline: 19960618

AB Steroid/nuclear hormone receptors are ligand-regulated transcription f factors that play key roles in cell regulation, differentiation, and oncogenesis. Many **nuclear receptors**, including the human 1,25-dihydroxyvitamin D3 receptor (VDR), bind cooperatively to DNA either as homodimers or as heterodimers with the 9-cis. . . transactivating species from the element in vivo, since RXR enhances and 9-cis RA and other RXR-specific ligands attenuate this induction. **Conversely**, when VDR is overexpressed, **vitamin D3** attenuates 9-cis RA induction from an RXR-responsive element. These effects, however, appear to be very sensitive to both the relative. . .

L2 ANSWER 4 OF 7 MEDLINE DUPLICATE 3
ACCESSION NUMBER: 95309505 MEDLINE
DOCUMENT NUMBER: 95309505 PubMed ID: 7540569
TITLE: Triiodothyronine modulates growth, secretory function and androgen receptor concentration in the prostatic carcinoma cell line LNCaP.
AUTHOR: Esquenet M; Swinnen J V; Heyns W; Verhoeven G
CORPORATE SOURCE: Department of Developmental Biology, Catholic University of
Leuven, Belgium.
SOURCE: MOLECULAR AND CELLULAR ENDOCRINOLOGY, (1995 Mar) 109 (1) 105-11.
Journal code: E69; 7500844. ISSN: 0303-7207.
PUB. COUNTRY: Ireland
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199507
ENTRY DATE: Entered STN: 19950807
Last Updated on STN: 19970203
Entered Medline: 19950727

AB . . . complex interplay between genetic events, paracrine interactions, and hormonal and dietary factors. These latter factors include several ligands of the **nuclear receptor** family such as androgens, **vitamin D3** and retinoids. To test whether thyroid hormones also influence the growth and differentiated function of prostatic carcinoma cells, LNCaP cells. . . thymidine incorporation. At higher concentrations of androgens, T3 displayed antiproliferative effects. No androgen-dependent effects on T3 receptor levels were observed. **Conversely**, T3 increased androgen receptor levels up

to twofold. Androgen as well as T3 stimulation of proliferation was abolished by high. . .

L2 ANSWER 5 OF 7 MEDLINE DUPLICATE 4
ACCESSION NUMBER: 94217729 MEDLINE
DOCUMENT NUMBER: 94217729 PubMed ID: 8164684
TITLE: Ligand modulates the conversion of DNA-bound vitamin D3 receptor (VDR) homodimers into VDR-retinoid X receptor heterodimers.
AUTHOR: Cheskis B; Freedman L P
CORPORATE SOURCE: Cell Biology and Genetics Program, Memorial Sloan-Kettering
Cancer Center, New York, New York 10021.
CONTRACT NUMBER: DK45460 (NIDDK)
NCI-P30-CA-08748 (NCI)
SOURCE: MOLECULAR AND CELLULAR BIOLOGY, (1994 May) 14 (5) 3329-38.
Journal code: NGY; 8109087. ISSN: 0270-7306.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199405
ENTRY DATE: Entered STN: 19940606
Last Updated on STN: 19940606
Entered Medline: 19940525
AB . . . a complex with auxiliary factors such as the heat shock proteins.

However, the role of ligand is less clear among **nuclear receptors**, since they are constitutively localized to the nucleus and are presumably associated with DNA in the absence of ligand. In this study, we have begun to explore the role of the ligand in **vitamin D3** receptor (VDR) function by examining its effect on receptor homodimer and heterodimer formation. Our results demonstrate that VDR is a. . . for VDR, decreases the amount of the DNA-bound VDR homodimer complex. It does so by significantly decreasing the rate of **conversion** of DNA-bound monomer to homodimer and at the same time enhancing the dissociation of the dimeric complex. This effectively stabilizes. . . for RXR, 9-cis retinoic acid, has the opposite effect of destabilizing the heterodimeric-DNA complex. These results may explain how a **nuclear receptor** can bind DNA constitutively but still act to regulate transcription in a fully hormone-dependent manner.

L2 ANSWER 6 OF 7 MEDLINE
ACCESSION NUMBER: 92355538 MEDLINE
DOCUMENT NUMBER: 92355538 PubMed ID: 1644784
TITLE: [Vitamin D: biosynthesis, metabolism and mechanism of action at the cellular level].
Vitamine D: biosynthese, metabolisme et mecanismes d'action
au niveau cellulaire.
AUTHOR: Berdal A
CORPORATE SOURCE: Unite INSERM U120, Hopital Robert Debre, Paris, France.
SOURCE: JOURNAL DE BIOLOGIE BUCCALE, (1992 Jun) 20 (2) 71-83.
Ref:
110
Journal code: HIR; 0400336. ISSN: 0301-3952.
PUB. COUNTRY: France
Journal; Article; (JOURNAL ARTICLE)
General Review; (REVIEW)
(REVIEW, TUTORIAL)
LANGUAGE: French
FILE SEGMENT: Dental Journals; Priority Journals
ENTRY MONTH: 199209
ENTRY DATE: Entered STN: 19920925
Last Updated on STN: 19980206
Entered Medline: 19920908

AB The term vitamin D includes various chemical species. **Vitamin D3** a true endogenous or alimentary prohormone is **converted** into its main metabolite, calcitriol, by successive hydroxylations in the liver in position 25 and in the kidney in position. . . mineralized tissues such as osteonectin, osteocalcin, osteopontin and calbindins. Therefore, it modulates very different cellular processes. It acts via a **nuclear receptor** the structure and function of which have been investigated by genetic engineering (cloning of genes encoding for the receptor and. . .

L2 ANSWER 7 OF 7 MEDLINE DUPLICATE 5
ACCESSION NUMBER: 92007476 MEDLINE
DOCUMENT NUMBER: 92007476 PubMed ID: 1655387
TITLE: Nongenomic actions of 1,25-dihydroxyvitamin D3 in rat osteosarcoma cells: structure-function studies using ligand analogs.
AUTHOR: Farach-Carson M C; Sergeev I; Norman A W
CORPORATE SOURCE: Department of Biological Chemistry, University of Texas Dental Branch, Houston 77030.
CONTRACT NUMBER: 2S07-RR-05970 (NCRR)
AR-39273 (NIAMS)
DK-09012-28 (NIDDK)
SOURCE: ENDOCRINOLOGY, (1991 Oct) 129 (4) 1876-84.
Journal code: EGZ; 0375040. ISSN: 0013-7227.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Abridged Index Medicus Journals; Priority Journals
ENTRY MONTH: 199110
ENTRY DATE: Entered STN: 19920124
Last Updated on STN: 20000303
Entered Medline: 19911030

AB . . . mediated largely by the opening of voltage-gated calcium channels. These cells also constitutively express high numbers (greater than 18,000/cell) of **nuclear receptors** for this seco-steroid hormone that are involved in the modulation of genomic activity in the osteoblast and in the up-regulation. . . transcription of osteoblast-specific genes such as osteocalcin. The objective of this study was to determine the structural hierarchy of **vitamin D3** analogs with regard to their efficacy as molecular transducers of the genomic and nongenomic pathways that are activated upon treatment. . . of 1,25-(OH)2D3 were used that contain A-ring, D-ring, and side-chain modifications. The abilities of these analogs/metabolites to 1) bind to **nuclear receptors** and 2) stimulate transmembrane calcium influx were measured. Several analogs (25-hydroxy-16-ene-23-yne-D3 and 25-hydroxy-23-yne D3) were found to stimulate Ca2+ channel opening, but bind only poorly to the 1,25-(OH)2D3 **nuclear receptor**. **Conversely**, other analogs (1,24-dihydroxy-22-ene-24-cyclopropyl D3 and 1,25-dihydroxy-16-ene-23-yne,26,27 F6-D3) were found to bind very well to the **nuclear receptor**, but displayed little or no activity in opening Ca2+ channels. Pertussis toxin, which interferes with coupling of certain ligand-gated receptors. . .

=> d his

(FILE 'HOME' ENTERED AT 15:29:30 ON 15 APR 2002)

FILE 'MEDLINE, BIOSIS, EMBASE, CAPLUS, USPATFULL' ENTERED AT 15:30:36 ON 15 APR 2002
L1 14 S (VITAMIN (A) D3) (S) CONVER? (S) (NUCLEAR (A) RECEPTOR)

```
L2            7 DUP REM L1 (7 DUPLICATES REMOVED)

=> s (vitamin (a) d3) (s) (nuclear (a) receptor) (s) gene (s) screen

   3 FILES SEARCHED...
L3            0 (VITAMIN (A) D3) (S) (NUCLEAR (A) RECEPTOR) (S) GENE (S) SCREEN

=> s (vitamin (a) d3) (p) (nuclear (a) receptor) (p) gene (s) screen

   4 FILES SEARCHED...
L4            0 (VITAMIN (A) D3) (P) (NUCLEAR (A) RECEPTOR) (P) GENE (S) SCREEN

=> s (vitamin (a) d3) (p) (nuclear (a) receptor) (p) gene

   2 FILES SEARCHED...
L5          179 (VITAMIN (A) D3) (P) (NUCLEAR (A) RECEPTOR) (P) GENE

=> s (vitamin (a) d3) (p) (nuclear (a) receptor) (p) (reporter (s) gene)

   4 FILES SEARCHED...
L6           30 (VITAMIN (A) D3) (P) (NUCLEAR (A) RECEPTOR) (P) (REPORTER (S)
               GENE)

=> dup rem l6

PROCESSING COMPLETED FOR L6
L7           14 DUP REM L6 (16 DUPLICATES REMOVED)

=> d l7 total ibib kwic


L7   ANSWER 1 OF 14  USPATFULL
ACCESSION NUMBER:        2001:110025  USPATFULL
TITLE:                   3-EPI COMPOUNDS OF VITAMIN D3 AND USES THEREOF
INVENTOR(S):             REDDY, SATYANARAYANA G., BARRINGTON, RI, United States
                         USKOKOVIC, MILAN, UPPER MONTCLAIR, NJ, United States
PATENT ASSIGNEE(S):      WOMEN AND INFANTS HOSPITAL (U.S. corporation)

                              NUMBER        KIND    DATE
                         ---------------- ------ --------
PATENT INFORMATION:      US 2001007907      A1   20010712
APPLICATION INFO.:       US 1998-80026      A1   19980515  (9)

                              NUMBER        DATE
                         ---------------- --------
PRIORITY INFORMATION:    US 1997-46643P     19970516 (60)
DOCUMENT TYPE:           Utility
FILE SEGMENT:            APPLICATION
LEGAL REPRESENTATIVE:    LAHIVE & COCKFIELD, 28 STATE STREET, BOSTON, MA, 02109
NUMBER OF CLAIMS:        26
EXEMPLARY CLAIM:         1
NUMBER OF DRAWINGS:      25 Drawing Page(s)
LINE COUNT:              3161
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
DETD   [0211] To test whether 3-epi analogs mediated transcription activation
       of vitamin D.sub.3 nuclear receptors (VD.sub.3R),
       ROS-17/2.8 cells were transfected with a construct containing the
       hormone gene as a reporter gene under the
       control of the osteocalcin vitamin D receptor response element (VDRE).
       The preparation of constructs, culture and transfection of ROS-17/2.8
       cells were carried out following standard protocols. In this assay,
       expression of the hormone gene is indicative of induction of
       VD.sub.3R by the vitamin D3 compounds tested.
       Transfected ROS-17/2.8 cells were contacted with 1.alpha.,25(OH).sub.2-
       16-ene-23-yne-3-epi D.sub.3 and its isomeric counterpart, and the
       transcriptional activity induced was. . . counterpart, this 3-epi
```

analog is as active as 1.alpha.,25(OH).sub.2D.sub.3 in mediating transcriptional activity. These results indicate that 3-epi analogs of **vitamin D3** can retain similar genomic activities as their isomeric counterparts.

L7 ANSWER 2 OF 14 EMBASE COPYRIGHT 2002 ELSEVIER SCI. B.V.
ACCESSION NUMBER: 2001173638 EMBASE
TITLE: Both 1,25-dihydroxyvitamin D3 and 9-cis retinoic acid inhibit telomerase in prostate cancer cell line.
AUTHOR: Ikeda N.; Hosaka M.
CORPORATE SOURCE: N. Ikeda, Department of Urology, University School of Medicine, Yokohama City, Japan
SOURCE: Yokohama Medical Journal, (2001) 52/1 (43-50).
Refs: 30
ISSN: 0372-7726 CODEN: YKIGAK
COUNTRY: Japan
DOCUMENT TYPE: Journal; Article
FILE SEGMENT: 005 General Pathology and Pathological Anatomy
016 Cancer
028 Urology and Nephrology
029 Clinical Biochemistry
037 Drug Literature Index
LANGUAGE: Japanese
SUMMARY LANGUAGE: English; Japanese
AB Combination of 1,25-Dihydroxyvitamin D3 (VD(3)) and 9-cis Retinoic acid (9-cis RA) inhibits growth of malignant cells. **Vitamin D3** receptor (VDR) that is the **nuclear receptor** for VD(3) makes heterodimer with retinoid X receptors (RXRs) that are the **nuclear receptor** for 9-cis RA. The heterodimer binds to specific response element consisting of two directly repeated pairs of motifs AGGTGA spaced by three nucleotides (DR3) and modulates the expression of VD(3)-responsive **genes**. Telomerase activity, which is detected in most immortal cells and germ cells, is complex of enzymes to maintain length of. . . and 9-cis RA. Cell growth of PC3 cells was inhibited with treatment of VD(3) and 9-cis RA as well. Luciferase **reporter** assay using plasmids containing various fragments of hTERT promoter revealed that the plasmids including DR3-like sequence was decreased luciferase activity. . .

L7 ANSWER 3 OF 14 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.DUPLICATE 1
ACCESSION NUMBER: 2001:92289 BIOSIS
DOCUMENT NUMBER: PREV200100092289
TITLE: BAG1L enhances trans-activation function of the vitamin D receptor.
AUTHOR(S): Guzey, Meral; Takayama, Shinichi; Reed, John C. (1)
CORPORATE SOURCE: (1) Burnham Inst., 10901 N. Torrey Pines Rd., La Jolla, CA,
92037: jreed@burnham-inst.org USA
SOURCE: Journal of Biological Chemistry, (December 29, 2000) Vol. 275, No. 52, pp. 40749-40756. print.
ISSN: 0021-9258.
DOCUMENT TYPE: Article
LANGUAGE: English
SUMMARY LANGUAGE: English
AB The vitamin D receptor (VDR) is a member of the steroid/retinoid receptor superfamily of **nuclear receptors** that has potential tumor-suppressive functions. We show here that VDR interacts with and is regulated by BAG1L, a nuclear protein. . . shorter non-nuclear isoforms of this protein (BAG1; BAG1M/Rap46), markedly enhanced, in a ligand-dependent manner, the ability of VDR to trans-activate **reporter gene** plasmids containing a vitamin D response element in transient transfection assays. Mutant BAG1L lacking the C-terminal Hsc70-binding domain suppressed (in a concentration-dependent fashion) VDR-mediated trans-activation of vitamin D response

element-containing **reporter gene** plasmids, without altering levels of VDR or endogenous BAG1L protein, suggesting that it operates as a trans-dominant inhibitor of BAG1L. **Gene** transfer-mediated elevations in BAG1L protein levels in a prostate cancer cell line (PC3), which is moderately responsive to VDR ligands, increased the ability of natural (1alpha,25(OH)2 **vitamin D3**) and synthetic (1alpha,25-dihydroxy-19-nor-22(E)-**vitamin D3**) VDR ligands to induce expression of the VDR target **gene**, p21Waf1, and suppress DNA synthesis. Thus, BAG1L is a direct regulator of VDR, which enhances its trans-activation function and improves. . .

L7 ANSWER 4 OF 14 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.
ACCESSION NUMBER: 2001:92634 BIOSIS
DOCUMENT NUMBER: PREV200100092634
TITLE: Nuclear receptors modulate the interaction of Sp1 and GC-rich DNA via ternary complex formation.
AUTHOR(S): Husmann, Matthias (1); Dragneva, Yolanta; Romahn, Eric; Jehnichen, Petra
CORPORATE SOURCE: (1) Institute of Medical Microbiology and Hygiene, Johannes-Gutenberg-University Mainz, Obere Zahlbacher Strasse 67, Hochhaus am Augustusplatz, D-55101, Mainz: MattHusmann@web.de Germany
SOURCE: Biochemical Journal, (15 December, 2000) Vol. 352, No. 3, pp. 763-772. print.
ISSN: 0264-6021.
DOCUMENT TYPE: Article
LANGUAGE: English
SUMMARY LANGUAGE: English
AB Binding sites for transcription factor Sp1 have been implicated in the transcriptional regulation of several **genes** by hormones or vitamins, and here we show that a GC-rich element contributes to the retinoic acid response of the interleukin 1beta promoter. To explain such observations, it has been proposed that **nuclear receptors** can interact with Sp1 bound to GC-rich DNA. However, evidence supporting this model has remained indirect. So far, **nuclear receptors** have not been detected in a complex with Sp1 and GC-rich DNA, and the expected ternary complexes in non-denaturing gels were not seen. In search for these missing links we found that **nuclear receptors** (retinoic acid receptor (RAR), thyroid hormone receptor (TR), **vitamin D3** receptor, peroxisome-proliferator-activated receptor and retinoic X receptor) induce an electrophoretic mobility increase of Sp1-GC-rich DNA complexes. Concomitantly, binding of Sp1 to the GC-box is enhanced. It is proposed that **nuclear receptors** may partially replace Sp1 in homo-oligomers at the GC-box. RARs and Sp1 can also combine into a complex with a. . . RAR and Sp1 in complexes with either cognate site was revealed in supershift experiments. The C-terminus of Sp1 interacts with **nuclear receptors**. Both the ligand- and DNA-binding domains of the receptor are important for complex formation with Sp1 and GC-rich DNA. In spite of similar capacity to form ternary complexes, RAR but not TR up-regulated an Sp1-driven **reporter** in a ligand-dependent way. Thus additional factors limit the transcriptional response mediated by **nuclear receptors** and Sp1.

L7 ANSWER 5 OF 14 BIOSIS COPYRIGHT 2002 BIOLOGICAL ABSTRACTS INC.DUPLICATE 2
ACCESSION NUMBER: 2000:334322 BIOSIS
DOCUMENT NUMBER: PREV200000334322
TITLE: Natural metabolites of 1alpha,25-dihydroxyvitamin D3 retain biologic activity mediated through the vitamin D receptor.
AUTHOR(S): Harant, H. (1); Spinner, D.; Reddy, G. S.; Lindley, I. J. D.
CORPORATE SOURCE: (1) Department of Inflammatory Diseases, Novartis Research Institute, Brunner Strasse 59, A-1235, Vienna Austria

SOURCE: Journal of Cellular Biochemistry, (April, 2000) Vol. 78, No. 1, pp. 112-120. print.
ISSN: 0730-2312.
DOCUMENT TYPE: Article
LANGUAGE: English
SUMMARY LANGUAGE: English
AB. . . mediates many of its effects through the intranuclear vitamin D receptor (VDR, NR111), that belongs to the large superfamily of **nuclear receptors**. Vitamin D receptor can directly regulate **gene** expression by binding to vitamin D response elements (VDREs) located in promoter or enhancer regions of various **genes**. Although numerous synthetic analogs of 1alpha,25(OH)2D3 have been analysed for VDR binding and transactivation of VDRE-driven **gene** expression, the biologic activity of many naturally occurring metabolites has not yet been analyzed in detail. We therefore studied the transactivation properties of 1alpha,24R,25-trihydroxyvitamin D3 (1alpha,24R,25(OH)3D3), 1alpha,25-dihydroxy-3-epi-**vitamin D3** (1alpha,25(OH)2-3-epi-D3), 1alpha,23S,25-trihydroxyvitamin D3 (1alpha,23S,25(OH)3D3), and 1alpha-hydroxy-23-carboxy-24,25,26,27-tetranorvitamin D3 (1alpha(OH)-24,25,26,27-tetranor-23-COOH-D3; calcitroic acid) using the human G-361 melanoma cell line. Cells were cotransfected with a VDR expression plasmid and luciferase **reporter gene** constructs driven by two copies of the VDRE of either the mouse osteopontin promoter or the 1alpha,25(OH)2D3 24-hydroxylase (CYP24) promoter.. . . effect was observed even for calcitroic acid in the presence of overexpressed VDR. The metabolites that were active in the **reporter gene** assay also induced expression of CYP24 mRNA in the human keratinocyte cell line HaCaT, although with less potency than the. . . ligand-binding assay based on nuclear extracts from COS-1 cells overexpressing human VDR demonstrated that the metabolites, although active in the **reporter gene** assay, were much less effective in displacing (3H)-labeled 1alpha,25(OH)2D3 from VDR than the parent hormone. Thus, we report that several. . .

L7 ANSWER 6 OF 14 MEDLINE DUPLICATE 3
ACCESSION NUMBER: 1998278980 MEDLINE
DOCUMENT NUMBER: 98278980 PubMed ID: 9614072
TITLE: 1alpha,25-dehydroxyvitamin D3 synergism toward transforming growth factor-beta1-induced AP-1 transcriptional activity in mouse osteoblastic cells via its nuclear receptor.
AUTHOR: Takeshita A; Imai K; Kato S; Kitano S; Hanazawa S
CORPORATE SOURCE: Department of Oral Microbiology, Meikai University School of Dentistry, Keyakidai, Sakado City, Saitama 350-02, Japan.
SOURCE: JOURNAL OF BIOLOGICAL CHEMISTRY, (1998 Jun 12) 273 (24) 14738-44.
Journal code: HIV; 2985121R. ISSN: 0021-9258.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199807
ENTRY DATE: Entered STN: 19980723
Last Updated on STN: 19980723
Entered Medline: 19980713
AB . . . 1alpha,25-dehydroxyvitamin D3 (1alpha-25-(OH)2D3) synergism toward transforming growth factor (TGF)-beta1-induced activation protein-1 (AP-1) activity in mouse osteoblastic MC3T3-E1 cells via the **nuclear receptor** of the vitamin. 1alpha-25-(OH)2D3 synergistically stimulated TGF-beta1-induced expression of the c-jun

gene in the cells but not that of the c-fos **gene**. We actually showed by a gel mobility shift assay 1alpha-25-(OH)2D3 synergism of TGF-beta1-induced AP-1 binding to the 12-(O-tetradecanoylphorbol-13-acetate response element (TRE). 1alpha-25-(OH)2D3 markedly stimulated the transient activity of TGF-beta1-induced AP-1 in the cells transfected with a TRE-chloramphenicol acetyltransferase (CAT) **reporter gene**. Also, a synergistic increase in TGF-beta1-induced CAT activity was observed in the cells cotransfected with an expression vector encoding **vitamin D3** receptor (VDR) and the **reporter gene**. However, the synergistic CAT activity was inhibited by pretreatment with VDR antisense oligonucleotides. In addition, in a Northern blot assay, we observed 1alpha-25-(OH)2D3 synergism of TGF-beta1-induced expression of the c-jun **gene** in the cells transfected with the VDR expression vector and also found that the synergistic action was clearly blocked by. . .

L7 ANSWER 7 OF 14 MEDLINE DUPLICATE 4
ACCESSION NUMBER: 96181556 MEDLINE
DOCUMENT NUMBER: 96181556 PubMed ID: 8601621
TITLE: 1,25(OH)2 vitamin D3, and retinoic acid antagonize endothelin-stimulated hypertrophy of neonatal rat cardiac myocytes.
AUTHOR: Wu J; Garami M; Cheng T; Gardner D G
CORPORATE SOURCE: Department of Medicine, University of California, San Francisco, 94143, USA.
CONTRACT NUMBER: HL-35753 (NHLBI)
SOURCE: JOURNAL OF CLINICAL INVESTIGATION, (1996 Apr 1) 97 (7) 1577-88.
Journal code: HS7; 7802877. ISSN: 0021-9738.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Abridged Index Medicus Journals; Priority Journals
ENTRY MONTH: 199605
ENTRY DATE: Entered STN: 19960517
Last Updated on STN: 20000303
Entered Medline: 19960507

AB 1,25(OH)2 **Vitamin D3** (VD3) and retinoic acid (RA) function as ligands for **nuclear receptors** which regulate transcription. Though the cardiovascular system is not thought to represent a classical target for these ligands, it is. . . clear that both cardiac myocytes and vascular smooth muscle cells respond to these agents with changes in growth characteristics and **gene** expression. In this study we demonstrate that each of these ligands suppresses many of the phenotypic correlates of endothelin-induced hypertrophy. . . peptide, and alpha-skeletal actin mRNA levels. Similar inhibition (VD3:30%; RA:33%; VD3 + RA:59% inhibition) was demonstrated when cells transfected with **reporter** constructs harboring the relevant promoter sequences were treated with VD3 and/or RA for 48 h. These effects were not accompanied by alterations in endothelin-induced c-fos, c-jun, or c-myc **gene** expression, suggesting either that the inhibitory locus responsible for the reduction in the mRNA levels lies distal to the activation of the immediate early **gene** response or that the two are not mechanistically coupled. Both VD3 and RA also reduced [3H]leucine incorporation (VD3:30%; RA:33%; VD3. . . ventriculocytes and, once again, the combination of the two was more effective than either agent used in isolation. Finally, 1,25(OH)2 **vitamin D3** abrogated the increase in cell size seen after endothelin treatment. These

findings suggest that the liganded vitamin D and retinoid. . .

L7 ANSWER 8 OF 14 MEDLINE DUPLICATE 5
ACCESSION NUMBER: 96182105 MEDLINE
DOCUMENT NUMBER: 96182105 PubMed ID: 8622645
TITLE: Selective effects of ligands on vitamin D3 receptor- and retinoid X receptor-mediated gene activation in vivo.
AUTHOR: Lemon B D; Freedman L P
CORPORATE SOURCE: Molecular Biology Program, Memorial Sloan-Kettering Cancer Center, New York 10021, USA.
CONTRACT NUMBER: CA08748 (NCI)
DK45460 (NIDDK)
SOURCE: MOLECULAR AND CELLULAR BIOLOGY, (1996 Mar) 16 (3) 1006-16.
Journal code: NGY; 8109087. ISSN: 0270-7306.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199606
ENTRY DATE: Entered STN: 19960627
Last Updated on STN: 19970203
Entered Medline: 19960618

AB Steroid/nuclear hormone receptors are ligand-regulated transcription f factors that play key roles in cell regulation, differentiation, and oncogenesis. Many **nuclear receptors**, including the human 1,25-dihydroxyvitamin D3 receptor (VDR), bind cooperatively to DNA either as homodimers or as heterodimers with the 9-cis. . . of these receptors. These experiments suggested a complex interaction between VDR and RXR and their respective ligands on inducible target **genes** in vivo. To examine these effects in cells, we used a transient-transfection strategy whereby we simultaneously introduced two different **reporter** plasmids that are selectively inducible by each ligand. Although VDR can bind as a homodimer to the osteopontin **gene** vitamin D response element, we find that a RXR-VDR heterodimer must be the transactivating species from the element in vivo, since RXR enhances and 9-cis RA and other RXR-specific ligands attenuate this induction. Conversely, when VDR is overexpressed, **vitamin D3** attenuates 9-cis RA induction from an RXR-responsive element. These effects, however, appear to be very sensitive to both the relative. . .

L7 ANSWER 9 OF 14 MEDLINE DUPLICATE 6
ACCESSION NUMBER: 96192924 MEDLINE
DOCUMENT NUMBER: 96192924 PubMed ID: 8614404
TITLE: TOR: a new orphan receptor expressed in the thymus that can modulate retinoid and thyroid hormone signals.
AUTHOR: Ortiz M A; Piedrafita F J; Pfahl M; Maki R
CORPORATE SOURCE: La Jolla Cancer Research Foundation, California 92037, USA.
SOURCE: MOLECULAR ENDOCRINOLOGY, (1995 Dec) 9 (12) 1679-91.
Journal code: NGZ; 8801431. ISSN: 0888-8809.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-U39071
ENTRY MONTH: 199606
ENTRY DATE: Entered STN: 19960613
Last Updated on STN: 19960805
Entered Medline: 19960603

AB . . . oncogenesis and also as regulators of the immune system. The active form of vitamin A, retinoic acid, as well as **vitamin D3** and thyroid hormones exert their actions by binding to specific **nuclear receptors** that represent one subfamily of the steroid/thyroid hormone receptor superfamily. To identify new members of

the retinoid/thyroid hormone receptor subfamily. . . a T cell cDNA library was performed using a retinoid X receptor probe. A clone was isolated encoding a novel **nuclear receptor** expressed mainly in the thymus and T cell line s. This new receptor, TOR (thymus orphan receptor), is most closely. . . two receptors and RZR beta in a phylogenetic tree, when both the DNA-binding domain and the ligand-binding domain sequences of **nuclear receptors** are compared. Thus, TOR is part of a subgroup of receptors, one of which has recently been reported to be. . . binding sites for thyroid hormone (TR), and retinoic acid receptors (RAR). In transient transfection experiments TOR does not activate a **reporter gene** carrying these sequences in the absence or the presence of any known **nuclear receptor** ligands. TOR, however, is able to repress TR and RAR activity on DR-4-TREs or DR-5-RAREs, respectively. Therefore, our data suggest. . .

L7 ANSWER 10 OF 14 MEDLINE DUPLICATE 7
ACCESSION NUMBER: 95373359 MEDLINE
DOCUMENT NUMBER: 95373359 PubMed ID: 7645420
TITLE: Use of vitamins A and D in chemoprevention and therapy of cancer: control of nuclear receptor expression and function. Vitamins, cancer and receptors.
AUTHOR: Niles R M
CORPORATE SOURCE: Department of Biochemistry and Molecular Biology, Marshall University School of Medicine, Huntington, WV 25755, USA.
SOURCE: ADVANCES IN EXPERIMENTAL MEDICINE AND BIOLOGY, (1995) 375 1-15.
Journal code: 2LU; 0121103. ISSN: 0065-2598.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199509
ENTRY DATE: Entered STN: 19950930
Last Updated on STN: 19970203
Entered Medline: 19950921
AB . . . This vitamin is well-known for its role in maintaining calcium homeostasis in the body. Recently it has been shown that **vitamin D3** can also inhibit tumor cell replication and stimulate differentiation of selected tumor types. Retinoic acid is being used clinically to treat promyelocytic leukemia, head and neck tumors as well as cervical dysplasia. Use of **vitamin D3** clinically has been restricted by its affect on calcium metabolism. Recently, however, new analogs of **vitamin D3** have been developed which have much less calcium mobilizing activity, yet still retain their tumor inhibitory properties. The action of both of these vitamins is mediated by **nuclear receptors** which have the same structure as steroid receptors. There are three nuclear retinoic acid receptors (RAR alpha, beta, and gamma), but only one **vitamin D3 nuclear receptor**. These receptors are expressed in very small amounts. Since the ligand should be in vast excess of receptor (ie not. . . to a retinoic acid response element (RARE) oligonucleotide compared to control cells. This correlated with a marked reduction of RA-stimulated RARE-**reporter gene** activity in transfected cells which were treated with cyclic AMP. Pre-treatment of B16 cells with cyclic AMP prior to RA. . .

L7 ANSWER 11 OF 14 MEDLINE DUPLICATE 8
ACCESSION NUMBER: 95223306 MEDLINE
DOCUMENT NUMBER: 95223306 PubMed ID: 7708050
TITLE: Transcriptional synergism between the vitamin D3 receptor and other nonreceptor transcription factors.
AUTHOR: Liu M; Freedman L P
CORPORATE SOURCE: Department of Pharmacology, Cornell University Graduate

School of Medical Sciences, New York, New York 10021.
CONTRACT NUMBER: DK-45460 (NIDDK)
P30-CA-08748 (NCI)
SOURCE: MOLECULAR ENDOCRINOLOGY, (1994 Dec) 8 (12) 1593-604.
Journal code: NGZ; 8801431. ISSN: 0888-8809.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199505
ENTRY DATE: Entered STN: 19950518
Last Updated on STN: 19990129
Entered Medline: 19950509

AB Small changes in the concentrations and/or combinations of trans-acting factors can result in profound alterations in **gene** expression. Synergistic interaction between different classes of transcription factors bound to distinct sites within a promoter/enhancer region is one mechanism by which this can occur. Reflecting this, hormone response elements, DNA recognition sites for steroid/**nuclear receptors**, are often found in promoter regions organized as multiple copies or are clustered among binding sites for other trans-acting factors. To systematically examine the potential interactions between one such receptor, the **vitamin D3** receptor (VDR), and other nonreceptor transcription factors, we constructed a series of **reporter** plasmids containing one copy of the osteopontin (Spp1) vitamin D response element (VDRE), consisting of two direct repeats spaced by 3 base pairs, and one binding site for the transcription factors SP1, NF-1, Oct-1, or AP-1. We also generated **reporters** either under the control of two copies of Spp1 VDRE, or a distinct VDRE from the human osteocalcin **gene** promoter. The various **reporters** were used to transiently transfect HeLa or CV-1 cells in the presence and absence of 1,25-dihydroxyvitamin D3. Our results show. . .

L7 ANSWER 12 OF 14 MEDLINE DUPLICATE 9
ACCESSION NUMBER: 92283822 MEDLINE
DOCUMENT NUMBER: 92283822 PubMed ID: 1597454
TITLE: Glucocorticoid-specific gene activation by the intact human glucocorticoid receptor expressed in yeast. Glucocorticoid specificity depends on low level receptor expression.
AUTHOR: Wright A P; Gustafsson J A
CORPORATE SOURCE: Centre for Biotechnology, Karolinska Institute, NOVUM, Huddinge University Hospital, Sweden.
SOURCE: JOURNAL OF BIOLOGICAL CHEMISTRY, (1992 Jun 5) 267 (16) 11191-5.
Journal code: HIV; 2985121R. ISSN: 0021-9258.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199207
ENTRY DATE: Entered STN: 19920717
Last Updated on STN: 19920717
Entered Medline: 19920706

AB In the presence of appropriate **reporter genes** mammalian **nuclear receptors** are competent to transactivate **gene** expression when expressed in yeast cells. Thus yeast genetics could be used to identify determinants of steroid specificity for these mammalian proteins. However, unlike the estrogen, progesterone, **vitamin D3**, and thyroid hormone receptors, the glucocorticoid receptor shows an apparently abnormal steroid specificity in yeast (Schena, M., and Yamamoto, K.. . .

L7 ANSWER 13 OF 14 MEDLINE DUPLICATE 10
ACCESSION NUMBER: 92268610 MEDLINE
DOCUMENT NUMBER: 92268610 PubMed ID: 1375251
TITLE: Regulation of keratin gene expression: the role of the nuclear receptors for retinoic acid, thyroid hormone, and vitamin D3.
AUTHOR: Blumenberg M; Connolly D M; Freedberg I M
CORPORATE SOURCE: Department of Dermatology, NYU Medical Center, NY 10016.
CONTRACT NUMBER: AR30682 (NIAMS)
AR39749 (NIAMS)
SOURCE: JOURNAL OF INVESTIGATIVE DERMATOLOGY, (1992 Jun) 98 (6 Suppl) 42S-49S.
Journal code: IHZ; 0426720. ISSN: 0022-202X.
PUB. COUNTRY: United States
Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 199206
ENTRY DATE: Entered STN: 19920710
Last Updated on STN: 19960129
Entered Medline: 19920625

AB . . . expression of epidermal keratins as a paradigm of keratinization processes and analyzed the effects of retinoic acid, thyroid hormone, and **vitamin D3** on keratin **gene** expression. DNA constructs in which keratin **gene** promoters drive expression of **reporter genes** were co-transfected with vectors expressing **nuclear receptors** for the above molecules into various cell types. The keratin promoters studied included K3, K5, K10, K14, and K16. The. . . cultures of rabbit corneal and esophageal epithelial cells and of human epidermal keratinocytes. We found that retinoic acid, via its **nuclear receptor**, suppresses expression of all the above-listed keratin **genes**. Thyroid hormone and its receptor similarly suppressed those **genes**. The site of interaction between these two receptors and the promoter sequences of K10 and K14 **genes** has been identified. Surprisingly, **vitamin D3** and its receptor had no direct effect on keratin promoters. Our results suggest that a retinoic acid has a twofold effect on keratin **gene** expression: by regulating keratinocyte differentiation it determines which keratins are expressed, basal cell specific or differentiation specific; by direct interaction between its receptor and keratin **genes**, retinoic acid determines the total amount of keratin protein within the cell. **Vitamin D3**, on the other hand, also regulates keratinocyte differentiation, but does not directly interact with the keratin **genes**.

L7 ANSWER 14 OF 14 CAPLUS COPYRIGHT 2002 ACS
ACCESSION NUMBER: 1992:421172 CAPLUS
DOCUMENT NUMBER: 117:21172
TITLE: Regulation of keratin gene expression: the role of the nuclear receptors for retinoic acid, thyroid hormone, and vitamin D3
AUTHOR(S): Blumenberg, Miroslav; Connolly, Deirdre M.; Freedberg, Irwin M.
CORPORATE SOURCE: Dep. Dermatol., NYU Med. Cent., New York, NY, 10016, USA
SOURCE: J. Invest. Dermatol. (1992), 98 42S-49S
CODEN: JIDEAE; ISSN: 0022-202X
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Keratinization, the orderly process of differentiation of epidermal keratinocytes from stratum basale to stratum corneum, is influenced by hormones and vitamins. Expts. utilizing expression of epidermal keratins as a paradigm of keratinization processes were used to analyze the effects

of retinoic acid, thyroid hormone, and **vitamin D3** on keratin gene expression. DNA constructs in which keratin **gene** promoters drive expression of **reporter genes** were co-transfected with vectors expressing **nuclear receptors** for the above mols. into various cell types. The keratin promoters studied included K3, K5, K10, K14, and K16. The recipient cell types were HeLa and primary cultures of rabbit corneal and esophageal epithelial cells and of human epidermal keratinocytes. Retinoic acid, via its **nuclear receptor**, suppressed expression of all the above-listed keratin genes. Thyroid hormone and its receptor similarly suppressed those genes. The site of interaction between these two receptors and the promoter sequences of K10 and K14 genes has been identified. Surprisingly, **vitamin D3** and its receptor had no direct effect on keratin promoters. Retinoic acid apparently has a 2-fold effect on keratin gene expression: by regulating keratinocyte differentiation, it dets. which keratins are expressed, basal cell specific or differentiation specific; and by direct interaction between its receptor and keratin genes, retinoic acid dets. the total amt. of keratin protein within the cell. **Vitamin D3**, on the other hand, also regulates keratinocyte differentiation, but does not directly interact with the keratin genes.

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